Control Network Solutions

OPENING NETWORK FRONTIERS

eNode™ IV Lon/WiFi 852 Router Update

One of the first questions potential users of the eNode™IV Lon/WiFi 852 router ask is, “What range can I get?”

The easy answer is it depends. Which is true, but not very informative? Wireless range depends on a lot of factors so it is difficult to predict with high accuracy what range a given application will achieve. With some forethought and understanding, however, it is straightforward to predict if range is likely to be a problem.

The range that a given set-up can obtain is largely determined by the transmit power, receiver sensitivity, and the transmission path losses or gains due to connectors, cables, and antennas and obstructions. Other important external factors influencing range are antenna height, wireless noise, and interference.

The eNode™IV Lon/WiFi 852 router is based on the Digi® WiME module. The relevant specifications for the module are as follows:

- Frequency Band = 802.11b 2.4 GHz
- Data Rate = up to 11 Mbps
- Transmit Power = 16 dBm
- Receiver Sensitivity = -82 dBm at 11 Mbps, -92 dBm at 1 Mbps

The eNode™IV Lon/WiFi 852 router is shipped with a 5 dbi Omni Directional whip antenna for significantly improved range. For an extra charge, we can also provide 15 dbi directional antennae to increase range even further.

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One way to get an estimate of the range possible is with a range calculator that is based on a mathematical model of the set-up. There are several of these available on the web. One good one is at **Antenna System Designer**. (You must request a free log in account to use the calculator.) The mathematical model provides a theoretical range or ball park figure. If the theoretical range for a given set up is less than the range required then it's not likely to work. If the theoretical range is well in excess of that required then there is a reasonable chance it will work. For marginal applications close to the theoretical range, only field testing will confirm.

Some field testing has been carried out to verify what real world ranges were possible with these units. Since most applications are for outdoor, building-to-building connectivity, the tests were performed outdoors. The tests consisted of two units in ad hoc mode with three different antenna configurations. The units were tested with clean line of sight in relatively uncluttered environments. Range was measured using GPS with an accuracy of +/- 5 meters. One unit was mounted approximately five meters above ground, the other two meters. Between 100 and 200 packets per second were sent across the WiFi connection. The results are as follows:

Test 1;

Each unit had a 2 dbi omni whip antenna.

At a range of 243 meters there was no degradation in packet rate.

At a range of 280 meters there was some degradation in packet rate (lost packets).

Test 2;
Each unit had a 5 dbi omni whip antenna.

At a range of 465 meters there was no degradation in packet rate.

At a range of 736 meters there was some degradation in packet rate.

Test 3;

In this test, one unit had a 5 dbi omni whip antenna; the other unit had a 15 dbi directional antenna.

At a range of 1242 meters there was no degradation in packet rate. It was not possible to get a clean line of sight for a longer range test to find the limiting range for this configuration.

To say the least we were pleasantly surprised by the range we could get with the standard 5 dbi antennas.

Indoors the range is limited by walls and interference. A range of 15 - 90 mtrs is usually all one can expect with a 2 dbi antenna.

For further information visit *www.cnsenode.com* or a quotation please contact *sales@cnsenode.com* or call directly via telephone number below.

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